Man-made climate change

From Chris Ennis

The scientific case for anthropogenic climate change is an exceedingly strong one. A synthesis of the science is provided by the Intergovernmental Panel on Climate Change (IPCC) and is freely available.

In response to Julian Overnell's letter (*Chemistry World*, May 2007), solar activity is accounted for in models of past climate; greenhouse gases neither do, nor are expected to, 'explain it all'. In answer to his point that we need to know the magnitude of the effect of solar activity on climate: we do. According to the IPCC's Fourth Assessment Report we are 90 per cent certain that changes in solar irradiance have given rise to a natural radiative forcing between 2.5 per cent and 50 per cent of the anthropogenic radiative forcing, with the most likely value being 7.5 per cent. That is, global warming is mostly human made.

In response to Ed Walker's letter (*Chemistry World*, April 2007), ice cores do indeed show temperature increases preceding CO_2 mixing ratio increases, due to dissolved CO_2 being released as oceans warm. The time lag between temperature rise and CO_2 mixing ratio rise is due to the large thermal mass of the oceans. By contrast, in the contemporary situation CO_2 mixing ratio rise has preceded the global average temperature rise. According to the IPCC's Fourth Assessment Report, at its 2005 value of 379 ppm, the CO_2 mixing ratio 'exceeds by far the natural range over the last 650 000 years (180 to 300 ppm)'. Furthermore, this extra CO_2 has been shown, through isotopic analysis and by simple accountancy, to be anthropogenic, largely the result of fossil fuel burning. That is, the recent dramatic rise of the CO_2 mixing ratio is mostly human made.

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